

WHAT IS CLAIMED IS:

1. A device for the acquisition and processing of data obtained from reading at least one type of optical code, comprising:

means for generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor comprising a plurality of pixels; and

means, connected to said means for generating said electrical signal, for processing said electric signal;

wherein said means for generating said electric signal comprises acquisition means for acquiring electric signals from said CMOS sensor according to at least one configuration of at least one member selected from the group consisting of shape and dimension of each pixel of at least a portion of said plurality of pixels, said configuration being dependent on said type of optical code.

2. A device according to claim 1, wherein said CMOS optical sensor comprises a plurality of elementary pixels and said acquisition means comprises means for grouping elementary pixels together into pixels such that each of said pixels comprises at least one elementary pixel, and

further comprising means for acquiring electric signals generated by said pixels.

3. A device according to claim 1, wherein said pixels have an active area and said acquisition means comprises means for modifying the active area of said pixels, and further comprising means for acquiring electric signals supplied by said pixels with a modified active area.

4. A device according to claim 2, wherein said at least one configuration comprises a first configuration in which each of said pixels has at least a first dimension, and at least a second configuration in which each of said pixels has at least a second dimension different from the first dimension.

5. A device according to claim 3, wherein said at least one configuration comprises a first configuration in which each of said pixels has at least a first dimension, and at least a second configuration in which each of said pixels has at least a second dimension different from the first dimension.

6. A device for the acquisition and processing of data obtained from reading at least one optical code, comprising:

means for generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor comprising a plurality of pixels; and

means for processing said electric signal, said processing means being connected to said generating means;

wherein said means for generating said electric signal comprises a acquisition means for acquiring electric signals from said CMOS optical sensor according to at least one configuration of at least one member selected from the group consisting of shape and dimension of each pixel of at least a portion of said plurality of pixels, said configuration being dependent on a reading condition.

7. A device for the acquisition and processing of data obtained from reading at least one optical code, comprising:

means for generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor; and

means for processing said electric signal, said processing means being connected to said generating means;

wherein said means for generating said electric signal comprises a configuration means for acquiring electric signals from said CMOS optical sensor and according to at least one configuration that is dependent on a reading condition; and

wherein said CMOS optical sensor comprises a plurality of sensing elements and said configuration means comprises means for grouping elements of said sensing elements together into a corresponding number of macropixels such that each of said macropixels comprises at least one sensing element, and

further comprising means for acquiring electric signals generated by said macropixels.

8. A device for the acquisition and processing of data obtained from reading at least one optical code, comprising:

means for generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor; and

means for processing said electric signal, said processing means being connected to said generating means;

wherein said means for generating said electric signal comprises a configuration means for acquiring electric signals from said CMOS optical sensor and according to at least one configuration that is dependent on a reading condition,

wherein said CMOS optical sensor comprises a plurality of sensing elements having an active area, and said configuration means further comprises means for modifying the active area of said sensing elements; and

said device further comprising means for acquiring electric signals supplied by said sensing elements with a modified active area.

9. A device according to claim 7, wherein said at least one configuration comprises a first configuration in which each of said macropixels has at least a first dimension, and at least one second configuration in which each of said macropixels has at least one second dimension that is different from the first dimension.

10. A device according to claim 8, wherein said at least one configuration comprises a first configuration in which each of said sensing elements has at least one first dimension, and at least one second configuration in which each of said sensing element has at least one second dimension that is different from the first dimension.

11. A device for the acquisition and processing of data obtained from reading optical codes, comprising:

means for generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor; and

means for processing said electric signal;

wherein said processing means is connected to said generating means;

wherein said means for generating said electric signal comprises configuration means for acquiring electric signals from said CMOS sensor according to a first configuration when acquiring a linear bar code, and according to at least one second configuration different from the first configuration when acquiring a stacked code.

12. A device according to claim 11, wherein said CMOS optical sensor comprises a plurality of elementary pixels and said configuration means comprises means for grouping said elementary pixels together into pixels such that each of said pixels comprises at least one elementary pixel, and

further comprising means for acquiring electric signals generated by said pixels.

13. A device according to claim 11, wherein said CMOS optical sensor further comprises a plurality of sensing elements having an active area and said configuration means comprises means for modifying said active area of said sensing elements; and

means for acquiring electric signals supplied by said sensing elements with a modified active area.

14. A device according to claim 11, wherein said CMOS optical sensor comprises a plurality of pixels and, when said configuration means acquires said electric signals according to said first configuration, said pixels have at least a first dimension and, when said configuration means acquires said electric signals according to said at least one second configuration, said pixels have at least a second dimension different from said first dimension.

15. A method for the acquisition and processing of data obtained from reading at least one optical code, comprising the steps of:

a) generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor comprising a plurality of pixels;

b) processing said electric signal;

wherein step a) comprises a step c) of acquiring electric signals from said CMOS sensor according to at least one configuration of at least one member selected from the group consisting of shape and dimension of each pixel of at least a portion of said plurality of pixels, said configuration being dependent on the type of optical code.

16. A method for the acquisition and processing of data obtained from reading at least one optical code, comprising the steps of:

a) generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor;

b) processing said electric signal;

wherein step a) comprises a step c) of acquiring electric signals from said CMOS sensor according to at least one configuration dependent on the type of optical code,

wherein said CMOS optical sensor comprises a plurality of elementary pixels, and

wherein step c) comprises the steps of:

grouping elementary pixels together into pixels such that each of said pixels comprises at least one elementary pixel; and

acquiring electric signals generated by said pixels.

17. A method for the acquisition and processing of data obtained from reading at least one optical code, comprising the steps of:

a) generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor;

b) processing said electric signal;

wherein step a) comprises a step c) of acquiring electric signals from said CMOS sensor according to at least one configuration dependent on the type of optical

code wherein said CMOS optical sensor comprises a plurality of sensing elements having an active area and step c) comprises the steps of:

modifying the active area of said sensing elements; and

acquiring electric signals supplied by said sensing elements with a modified active area.

18. A method according to claim 15, wherein said step c) further comprises the step of modifying the shape of said pixels.

19. A method according to claim 15, wherein said step c) further comprises the step of modifying at least one dimension of said pixels.

20. A method for the acquisition and processing of data obtained from reading at least one optical code, comprising the steps of:

a) generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor comprising a plurality of pixels; and

b) processing said electric signal;

wherein step a) comprises a step c) of acquiring electric signals from said CMOS sensor according to at least one configuration of at least one member selected from the group consisting of shape and dimension of each pixel of at least a portion of said plurality of pixels, said configuration being dependent on a reading condition.

21. A method for the acquisition and processing of data obtained from reading at least one optical code, comprising the steps of:

a) generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor; and

b) processing said electric signal;

wherein step a) comprises a step c) of acquiring electric signals from said CMOS sensor according to at least one configuration that is dependent on a reading condition, wherein said CMOS optical sensor comprises a plurality of elementary pixels, and

wherein said step c) comprises the step of grouping elementary pixels together into pixels such that each of said pixels comprises at least one elementary pixel; and
said method further comprising the step of acquiring electric signals generated by said pixels.

22. A method for the acquisition and processing of data obtained from reading at least one optical code, comprising the steps of:

a) generating an electric signal correlated to the brightness of an image obtained through a CMOS optical sensor; and

b) processing said electric signal;

wherein step a) comprises a step c) of acquiring electric signals from said CMOS sensor according to at least one configuration that is dependent on a reading condition, wherein said CMOS optical sensor comprises a plurality of sensing elements having an active area and wherein said step c) comprises the steps of:

modifying the active area of said sensing elements; and

acquiring electric signals supplied by said sensing elements with a modified active area.

23. A method according to claim 20, wherein said step c) further comprises modifying the shape of said pixels.

24. A method according to claim 20, wherein said step c) further comprises the step of modifying at least one dimension of said pixels.

25. A method for the acquisition and processing of data obtained from reading optical codes, comprising the steps of:

a) acquiring an image through a CMOS optical sensor comprising a plurality of pixels; b) processing said image to extract optical coded data there from;

c) attempting a reading of said extracted optical coded data;

d) verifying whether the reading of said step c) has been successful;

e) if the verification of said step d) has not been successful, modifying the shape of said pixels and returning to step a).

26. A method according to claim 25, wherein said step a) is preceded by a step i) of setting a height for said pixels; and wherein the modification of said step e) comprises the step of reducing said pixel height.

27. A method according to claim 25, wherein at least one of said pixels comprises at least one elementary pixel, and step e) comprises varying the number of elementary pixels of said pixel.

28. A method according to claim 25, wherein at least one of said pixels has an active area, and said step e) comprises modifying the active area of said pixel.

29. A device for the acquisition and processing of data obtained from optical codes, comprising:

means for generating an electric signal correlated to the brightness of an image through a CMOS optical sensor comprising a plurality of pixels; and

means, connected to said means for generating said electric signal, for processing said electric signal;

wherein said means for generating said electric signal comprises acquisition means for acquiring electric signals from said CMOS sensor according to a first pixel configuration for a first type of optical code and according to at least a second pixel configuration for at least one different type of optical code, said first and second configurations being different from each other at least in one of shape and dimension of the respective pixels.

30. A device according to claim 29, wherein, in said first configuration, each of said respective pixels has at least a first dimension and wherein, in said at least one second configuration, each of said respective pixels has at least a corresponding second dimension different from the first dimension.

31. A device according to claim 29, wherein, in said first configuration, each of said respective pixels has a first shape and in said at least one second configuration each of said respective pixels has second shape different from the first shape.

32. A device according to claim 29, wherein said CMOS optical sensor comprises a plurality of elementary pixels and said acquisition means comprises means for grouping elementary pixels together into said pixels such that each of said pixels comprises at least one elementary pixel and wherein, in said first configuration, each of said respective pixels comprises a first number of elementary pixels and, in said at least one second configuration, each of said respective pixels comprises a second number of elementary pixels different from the first one.

33. A method for the acquisition and processing of data obtained from reading optical codes, comprising the steps of:

a) acquiring a first image through a CMOS optical sensor comprising a plurality of pixels, said first image being acquired by acquisition of electric signals from said CMOS sensor according to a first configuration of at least a portion of said plurality of pixels;

b) processing said image to extract optical coded data there from;

c) attempting a reading of said extracted optical coded data;

d) verifying whether the reading of said step c) has been successful;

e) if the verification of said step d) has a negative result, acquiring a second image by acquisition of electric signals from said CMOS sensor according to a second configuration different from said first configuration at least in one of shape and dimension of the respective pixels.

34. A device for the automatic acquisition of data obtained from optical codes, said device being connectable to an external data-processing unit, said device comprising:

a CMOS optical sensor, comprising a plurality of CMOS sensing elements, adapted to generate an analog electric signal correlated to the light incident on said CMOS sensing elements;

an analog processing unit connected to said CMOS optical sensor adapted to process said analog electric signal; and

an analog/digital conversion unit connected to said analog processing unit adapted to convert said analog electric signal into a digital signal;

wherein said device further comprises:

a transfer interface unit connected to said analog/digital conversion unit adapted to directly transfer said digital signal to said external data-processing unit.

35. A device according to claim 34, wherein said transfer interface unit is at least one member selected from the group consisting of: a USB interface, a radio interface, a telephone interface, a GSM interface and a satellite interface.

36. A device according to claim 34, wherein said transfer interface unit is a RAM.

37. A device according to claim 34, wherein said transfer interface unit is a Direct Memory Access Controller.

38. A device according to claim 34, wherein said transfer interface unit is further adapted to receive commands from said external data-processing unit.

39. A device according to claim 34, wherein said CMOS optical sensor and at least one element, selected from the group consisting of said analog processing unit, said analog/digital conversion unit and said transfer interface unit, are integrated in a single chip.

40. A method for automatically acquiring data obtained from optical codes by means of an acquisition device, the method comprising the steps of:

generating an analog electric signal correlated to the brightness of an image through a CMOS optical sensor;
analog processing said analog electric signal; and
converting said analog electric signal into a digital signal;
said method further comprising the step of sending said digital signal to a transfer interface unit, included in said acquisition device, for the direct transfer of said digital signal to a data-processing unit external to said acquisition device.

41. A device for the acquisition and automatic processing of data obtained from optical codes, comprising:

a CMOS optical sensor, comprising a plurality of CMOS sensing elements, adapted to generate an analog electric signal correlated to the light incident on said CMOS sensing elements;

an analog processing unit connected to said CMOS optical sensor adapted to process said analog electric signal;

an analog/digital conversion unit connected to said analog processing unit adapted to convert said analog electric signal into a digital signal; and

a data-processing unit, connected to said analog/digital conversion unit, adapted to process said digital signal to extract coded optical data,

wherein said device further comprises:

an unit functionally interposed between said analog/digital conversion unit and said data-processing unit for rendering said digital signal accessible to said data-processing unit.

42. A device according to claim 41, wherein said data-processing unit comprises at least one member selected from the group consisting of:

a microprocessor;

a program memory unit; and

an image memory unit.

43. A device according to claim 42, wherein said unit comprises a Direct Memory Access Controller functionally interposed between said analog/digital conversion unit and said image memory unit.

44. A device according to claim 41, wherein said interface unit comprises storing means functionally interposed between said analog/digital conversion unit and said data processing unit.

45. A device according to claim 44, wherein said storing means is a volatile memory.

46. A device according to claim 41, further comprising a logic control unit connected to said CMOS optical sensor, to said analog processing unit, to said analog/digital conversion unit and to said data processing unit.

47. A device according to claim 46, wherein said data-processing unit comprises a micro-processor and said logic control unit is integrated in said microprocessor.

48. A device according to claim 46, wherein said logic control unit is distributed in said CMOS sensor, said analog processing unit and said analog/digital conversion unit.

49. A device according to claim 46, wherein said CMOS optical sensor and at least one element, selected from the group consisting of said analog processing unit, said analog/digital conversion unit and said logic control unit, are integrated in a single image detector.

50. A device according to claim 41, further comprising a battery supply unit.

51. A device according to claim 41, further comprising user interface means.

52. A device according to claim 51, wherein said user interface means comprise a display unit.

53. A device according to claim 51, wherein said user interface means comprises at least one member selected from a keyboard and a mouse.

54. A device according to claim 41, further comprising means for acquiring low-resolution images; means for searching regions of interest in said low-resolution images; means for acquiring high-resolution images for said regions of interest and means for decoding data in said high-resolution images.

55. A device according to claim 54, wherein said low-resolution image acquisition means comprise means for selectively interrogating only some of said CMOS sensing elements of said plurality of CMOS sensing elements.

56. A device according to claim 54, wherein said low-resolution image acquisition means comprises means for grouping adjacent groups of said CMOS sensing elements together into macropixels and means for acquiring electric signals generated by each of said macropixels.

57. A device according to claim 54, wherein said low-resolution image acquisition means comprise means for modifying the active area of said CMOS sensing elements and means for acquiring electric signals supplied by said CMOS sensing elements with a modified active area.